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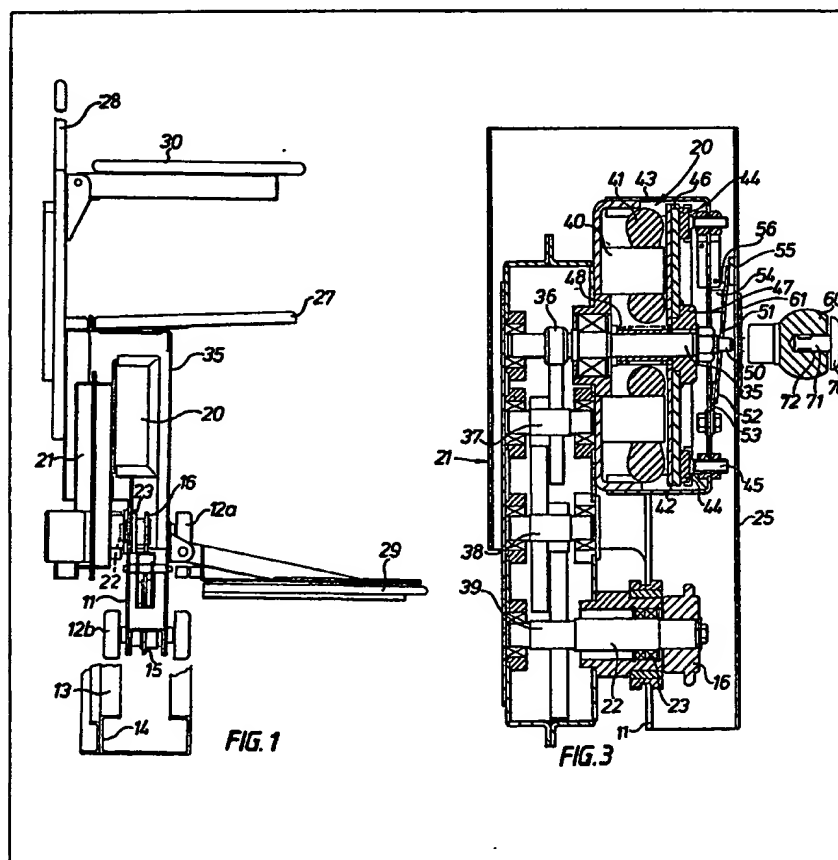
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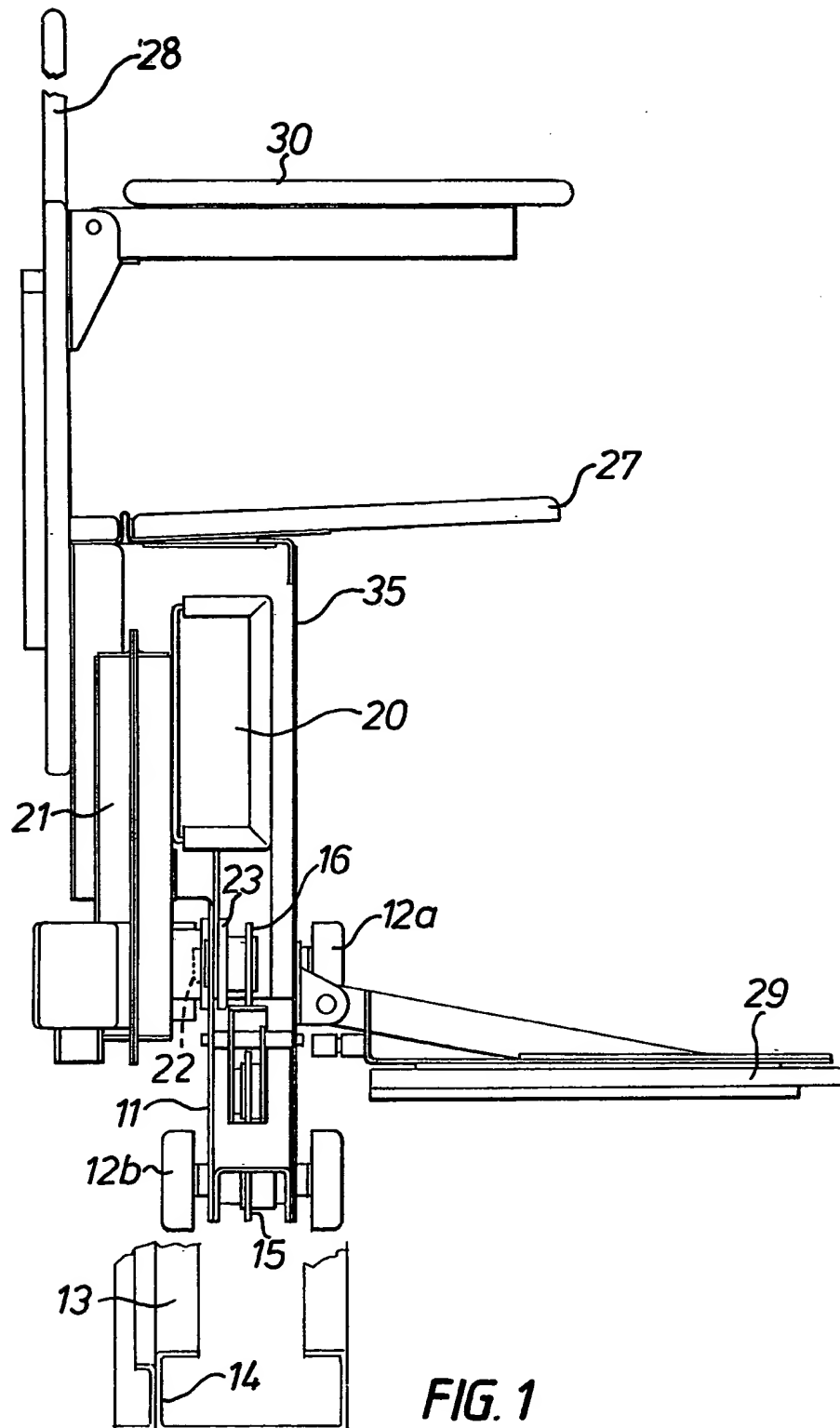
Nottingham NG1 5BP

(54) Stairway chair lift

(57) A chair lift has a body housing a face plate electric motor (20) with a stator (40) and a shaft (35) secured to a face plate (42) which is driven by excitation of the stator. Spur gears (21) extend from the shaft to a driven sprocket (16) which engages a stairway track. The face plate is biased by a spring (48) into engagement with brake blocks (44) and excitation of the stator draws the face plate off the blocks against the bias. A knob (60) can be engaged with an end of the shaft (35) for manual turning of the shaft in the event of power failure, a switch (56) to the motor being "off" when the knob is engaged with the shaft.



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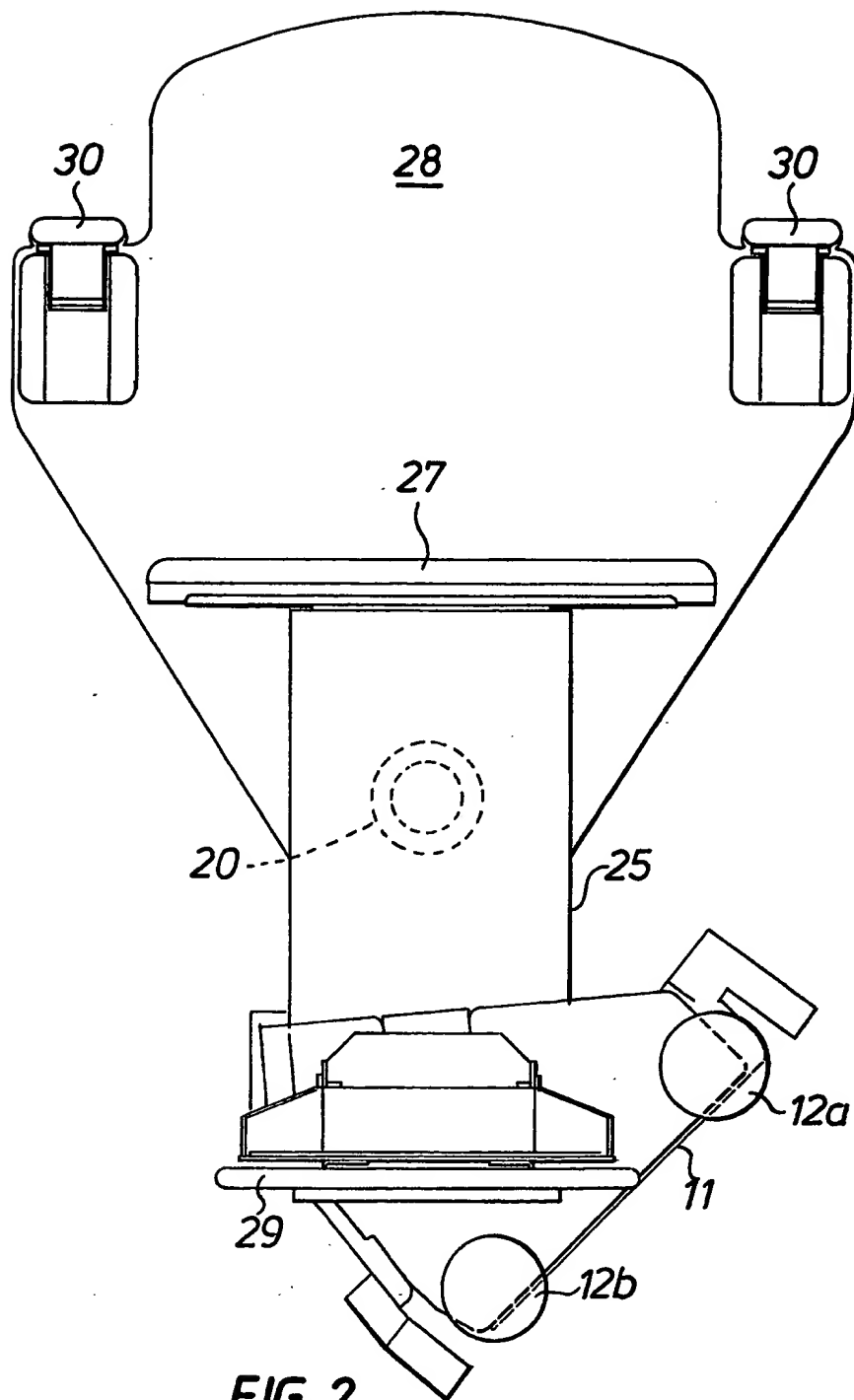


FIG. 2

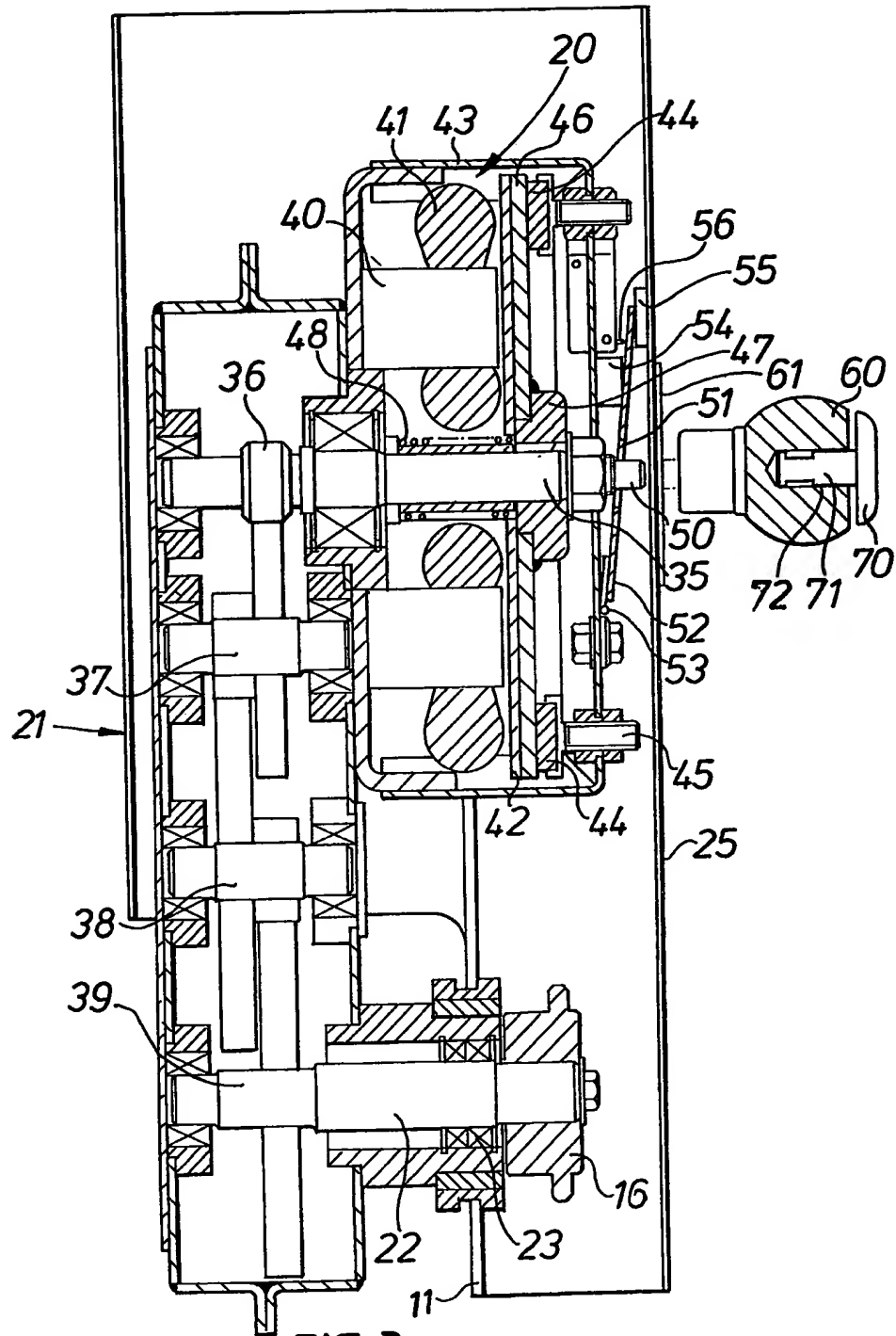


FIG. 3

SPECIFICATION

Stairway chair lift

- 5 This invention relates to a stairway chair lift. Such lifts run on a track provided alongside a stairway for assisting incapacitated people to ascend and descend the stairway. The lift often comprises a body housing a drive motor and provided with a seat, backrest and footrest platform. The drive motor may drive a sprocket which may engage with a rack or chain, fixed along the track. Alternatively, the lift may be hauled by a cable or other means driven by a motor in a separate housing fixed at one end of the track.

- 10 In a domestic dwelling it is very difficult to find somewhere to mount a separate fixed motor and, for this reason, the type of lift housing the motor is often preferred. Such lifts are, however, very bulky and either, the track has to be very wide, or there is a substantial overhang of the stairway. In the former case, the effective width of the stairway may have to be inconveniently narrow and, in the latter case, the space on the landings may be unreasonably obstructed.

- 20 The present invention provides a chair lift which can be made small and compact whilst housing a drive motor.

- 25 In accordance with this invention, there is provided a stairway lift comprising a body housing a drive motor and supporting a seat and a foot rest platform, the motor being connected to a driven output member for engaging a stairway track, wherein the motor is electrically powered and includes a stator and a rotatably driven face plate adjacent the stator, and a transmission arrangement (such as a spur gear train) between the face plate and the driven output member. It is preferred that the face plate, the gears and the output member are all axially parallel and, advantageously, the output member, which may be a sprocket, is located directly beneath the motor.

- 30 Also preferably, braking means is provided associated with the face plate and the latter is biased axially into the braking position, excitation of a stator of the motor serving to release the plate from the braking means.

- 35 In the event of a fault or power failure, it may be required for the chair lift to be manually operated. To this end, there is provided an engagement member rotatable with the face plate, a manually graspable member (such as a knob or wheel) engageable with the engagement member, and switch means controlling the motor and arranged to switch off the motor when the graspable member is engaged with the engagement member.

Reference is now made to the accompanying drawings, wherein:-

- 40 *Figure 1* is a side elevation of a chair lift according to the invention;

Figure 2 is a front elevation of the chair lift; and

Figure 3 is a sectional view of drive means of the chair lift.

- 70 Referring to Figs. 1 and 2, there is shown a body 11 rotatably mounting two spaced pairs of wheels 12a, 12b which run on rails 13 of a track 14. On the axle of each pair of wheels 12a, 12b is a respective sprocket 15 (only one shown). A driven sprocket 16 is mounted between and in the plane of the sprockets 15 to define a triangular arrangement. In operation, a chain (not shown) is fixed along the track and passes round the three sprockets, so that rotation of the driven sprocket drives the body along the track.

- The body supports an electric motor 20 mounted directly above the driven sprocket 16 with spur gears 21 between the motor and the driven sprocket 16. The driven sprocket 16 is carried by a shaft 22 engaged in a bearing 23, which in turn, is mounted in a slot in the body 11. The chain (not shown) serves to hold the motor in position. A casing 25 is mounted on the body 11 and is bolted thereto. The casing can be unbolted and lifted off the body to expose the motor and gears. The casing supports a chair seat 27, chair back 28, foot platform 29 and arm rests 30. The arm rests, seat and platform can be pivoted upwardly to non-projecting positions.

- Referring now to Fig. 3, there is shown a main shaft 35 of the motor 20 carrying a gear 36. Spur gears 37, 38 and 39 are connected in series with the gear 36, the shaft of the last spur gear 39 being integral and continuous with the shaft 22 of the driven sprocket 16.

- The motor 20 is a face-plate type motor operating on the linear motor principle. The motor has a stator 40 with windings 41 which rotatably drive a face plate 42 mounted on a rotor 46. The rotor 46 is fixed to a hub 47 on the main shaft 35. The motor is accommodated in a housing 43, which mounts brake pads 44, held by mounts 45 screwed into the housing. A helical spring 48 engages the hub 47 and biases the rotor axially against the brake pads 44, so that the rotor is braked when the motor is inoperative. The arrangement is such that the attraction of the face plate 42 to the stator 40 during operation of the motor is sufficient to overcome the bias and permit driven rotation of the rotor 46.

- 120 The main shaft 35 carries an engagement portion 50, e.g. of square-section outside the housing 43. This portion extends through an aperture 51 in an arm 52, which is hinged at 53 to the housing 43. The arm extends between resilient vibration damping blocks 54, 55, which locate the arm in a position out of contact with an actuating member 56 of a switch. The switch is in a solenoid control circuit for controlling the motor and is biased to the "on" position.

A knob 60 has a socket complementary to the engagement portion 50 and can be pushed onto this portion for manual control. A cover plate 61 is removable to uncover an aperture in the casing 25 to permit access. As the knob reaches the engaged position, it moves the arm 51 against the resilient bias of the insulation block 54 to actuate the actuating member 56 of the switch, so that the latter switches "off" the motor. Pressure on the knob against the bias of the spring 48 moves the rotor 46 off the brake pads 44 to permit manual rotation of the motor shaft 35.

A bearing plate 70 has a spindle 71 rotatably engaged in a socket 72 in the knob 60 and retained in the knob by an annular clip device 73. The chair lift can, therefore be permitted to descend under gravitational forces by putting pressure on the bearing member, the spindle 71 being axially aligned with the shaft 35. Control of the rotation is possible by varying the grip on the knob 70.

In an alternative embodiment (not shown), the knob is replaced by a relatively large wheel and the engagement portion 50 of the shaft 35 is normally concealed by a cover plate, which has to be removed to permit access to the engagement portion. The electric switch is biased to the "off position" and has its actuating member held in the "on" position by the cover plate, so that on removal of the latter, the motor is switched off.

CLAIMS

1. A stairway chair lift comprising a body housing a drive motor and supporting a seat and a foot-rest platform, the motor being connected to a driven output member for engaging a stairway track, wherein the motor is electrically powered and includes a stator and a rotatably driven face plate adjacent the stator, and a transmission arrangement between the face plate and the driven output member.
2. A stairway chair lift according to Claim 1, including braking means associated with the face plate, the latter being axially movable and biased into the braking position, the face plate being axially movable against the bias out of the braking position by electrical excitation of the stator.
3. A stairway chair lift according to Claim 1 or 2, wherein the axis of the driven output member is located below the motor, in the position of use, and is parallel to the axis of the face plate.
4. A stairway chair lift according to Claim 3, wherein the transmission means comprises a train of spur gears from a shaft of the face plate to a shaft of the output member.
5. A stairway chair lift according to any preceding claim including an engagement member rotatable with the face plate, a manually graspable member engageable with the engagement member, and switch means con-

trolling the motor and arranged to switch off the motor when the graspable member is engaged with the engagement member.

6. A stairway chair lift constructed substantially as herein described with reference to the accompanying drawings.

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